

# Save A Life

## *Monitoring for Emergency Locator Transmitters*

by Laura Quarantiello

According to the United States Air Force Air Rescue Service, the typical time required to locate a downed airplane is 55.6 hours. If the plane has an Emergency Locator Transmitter (ELT) aboard, the time drops to a mere 13.6 hours -- a difference of almost two days. Considering the range of injuries possible during the downing of an aircraft and the potentially large number of people involved, the use of an ELT can mean the difference between life and death for hundreds.

### What is an ELT?

Emergency Locator Transmitters are battery-operated electronic radio transmitters which broadcast a characteristic "swept tone" on 121.5 and 243.0 megahertz in the civilian and military aviation bands. Activating upon impact, these devices are designed to broadcast for up to fifty hours, providing

homing and guidance information to search and rescue crews.

Two types of ELTs are currently in use aboard aircraft. One radiates 75 milliwatts of power and is designed for airplanes operating over land areas. The second type is capable of 225 milliwatts of power and is for use by aircraft on over-water flights. Its activation occurs manually by the pilot or following exposure to salt water.

### Fifteen Years of False Alarms

In 1974, following a Congressional amendment to the 1970 Occupational Safety and Health Act, the Federal Aviation Administration effected a regulation requiring most civil aircraft of the United States registry to carry ELTs. The only exceptions were agricultural, research, local training flight and signal seat aircraft, helicopters and turbojets.

What followed was fifteen years of troubling false alarms and ELTs that failed to activate when needed. When the devices where not needed, it seemed as though anything could set off these sensitive devices. To make matters worse, early models used lithium sulphur dioxide batteries which were known to vent volatile and caustic gases into the air. For a while it looked like the lifesavers were causing more trouble than good.

Eventually, ELT batteries have been replaced with alkaline or magnesium cells to reduce the risk of corrosion. At the same time, the devices were redesigned to withstand the impact of hard landings and severe braking without going off.

By early April 1990, the FAA had issued a Notice of Proposed Rulemaking to upgrade performance standards of ELTs even further. Under these new standards, ELT G Force sensitivity has been downgraded to reject

U.S. Coast Guard photo: PA1 Carolyn Feldman, photographer

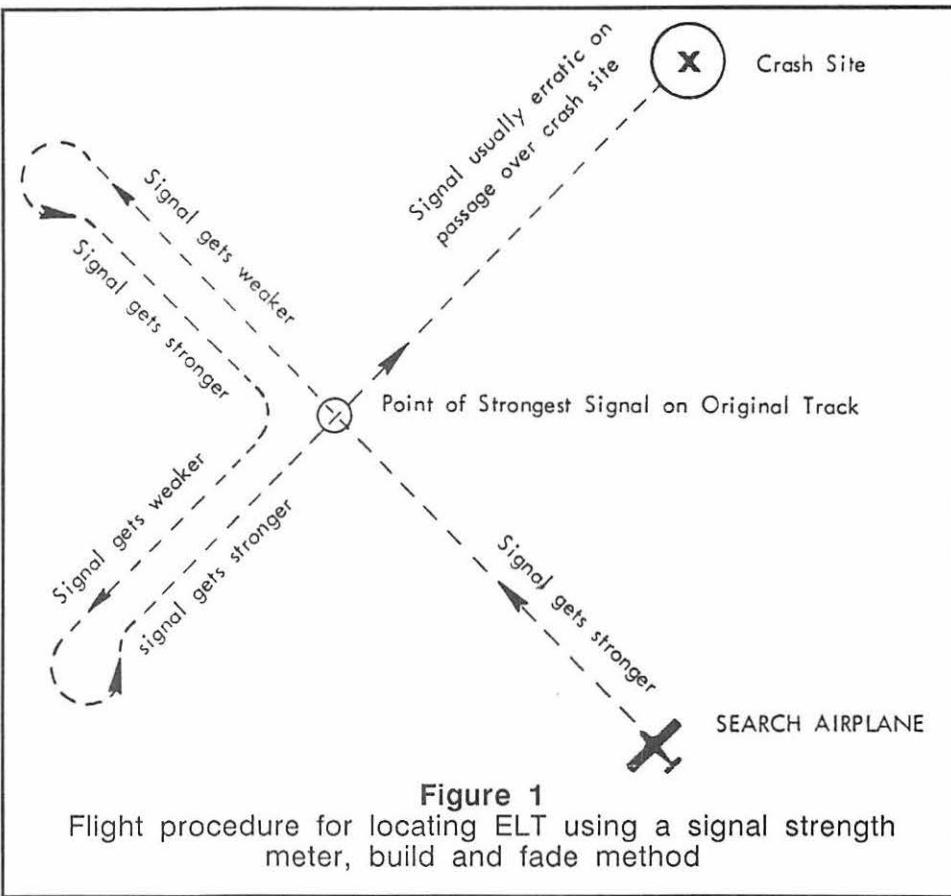


activations that might result from excessive ground and flight loads. It is hoped that this will help prevent the unnecessary launching of rescuers for aircraft that are not in distress but simply have a malfunctioning ELT. At the current time, ELTs are required to activate at an inertial force of 5 Gs and a force duration of longer than 11 milliseconds.

## Search and Rescue

The responsibility for search and rescue (SAR) of downed aircraft belongs to the United States Coast Guard and the United States Air Force through the Civil Air Patrol. In addition, three US and three Soviet satellites eight hundred miles up in space continuously orbit the globe. Their job is to keep their electronic ears wide open for aviation and maritime distress beacons. The majority of signal responses are handled by the Air Force Rescue Coordination Center (AFRCC) located at Scott Air Force Base in Illinois.

AFRCC attempts, through satellite overpasses, flight plans of overdue aircraft, and aircraft passing in the vicinity of the ELT signal, to determine if the signal is genuine. Usually, two satellite passes are needed to confirm true or false. If, on the second hit, it turns out to be an actual distress beacon, controllers at AFRCC open an incident file



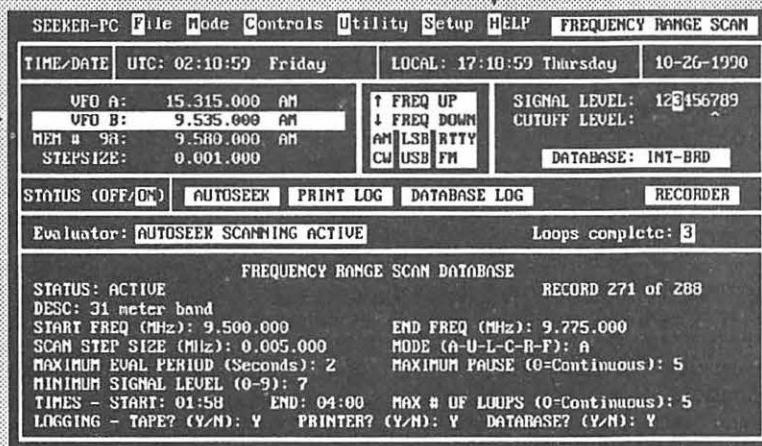
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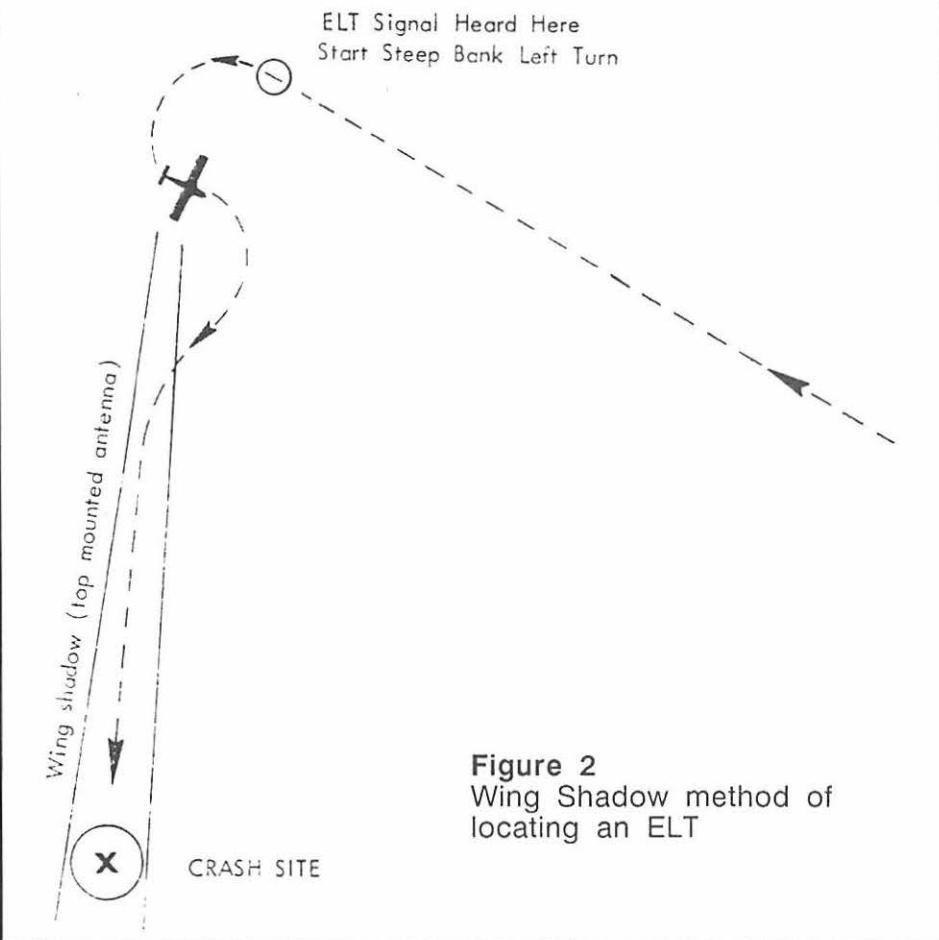
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**Table 1**  
Emergency and  
Search and Rescue  
Frequencies

121.5	Civilian Emergency
243.0	Military Emergency "Guard"
123.1	SAR
122.925	SAR
122.9	SAR
122.75	Air-to-air
122.85	Air-to-air
123.45	Air-to-air
47.46	SAR
155.160	SAR
155.235	SAR
149.245	SAR
148.150	Civil Air Patrol
4582.0	CAP Emergency Shortwave
282.8	US Coast Guard SAR
3023	US Coast Guard SAR
	Shortwave
5680	US Coast Guard SAR
	Shortwave
40.50	US Army SAR



**Figure 2**  
Wing Shadow method of  
locating an ELT

and institute a telephone search for the aircraft. Airports nearest the signal are contacted to rule out if it is coming from parked aircraft. Air Traffic Control is questioned about overdue flights. All bases are covered before a search team is finally sent out. This part of the process can take up to two hours.

In 1988, out of 54,292 signals processed by AFRCC, 1,863 missions were initiated with 85 downed aircraft recovered.

## 406 MHz ELTs

In order to move away from the often crowded aviation frequency band, a new ELT has been developed to operate on 406 megahertz. Designed to function in coordination with the Search and Rescue Satellite Aided Tracking System (SARSAT), this ELT will be able to provide aircraft registration number, length of time the transmitter has been activated, and latitude/longitude information (if equipped to operate with Loran C) within its signal.

Performing on 406 MHz, less adjacent-channel interference will be experienced and signal accuracy will be enhanced. 121.5 MHz is an unstable frequency in a cluttered band, making definite position and distance measurements difficult.

The one drawback to this new Emergency Locator Transmitter is its price tag -- nearly two times that of the 121.5/243.0 MHz units. This would place it out of the reach of many civilian aircraft owners and operators. The benefits of what the FAA calls a "triple-frequency" ELT cannot be denied, particularly for aircraft flying in remote areas. It could, say some, mean the difference between rescue and another night out in the cold.

## Listening to ELTs

Your scanner, if possible, should always have two slots reserved for 121.5 and 243.0 MHz. In civilian aircraft, this channel is referred to as the "Emergency Frequency." To the military, it is known as "Guard." Military aircraft religiously monitor Guard, as do air traffic control facilities worldwide.

You will recognize an Emergency Locator Transmitter signal immediately by its swept tone. Says one *Monitoring Times* reader who has heard one, "It's a very distinctive siren-like tone that repeats two or three times per second. The sound is something like a police siren or burglar alarm. In any case," he says, "you will recognize it the moment that you hear it. It just jumps out at you."

If you should monitor one, check the

frequency of the nearest air traffic control facility to your location for any communications regarding the ELT. If none are heard, notify the FAA by telephone, stating that you are a radio communications monitor, your approximate geographic location (latitude/-longitude, if you know it; street/cross-street if you do not) and the strength of the signal, especially if it has faded since you began listening. Remember to also give your phone number so that the authorities can stay in touch -- you are a vital part of the rescue operation and your continued reports can help save lives.

Voice communications may also be heard on Guard as search and rescue facilities communicate with downed aircraft or aircraft in distress on this frequency. Air traffic controller will also resort to calling military aircraft on Guard if all other means of contact fail. SAR-related frequencies are listed in Table 1. Tuning in these will put you in touch with the action as air, sea and land units work to find the source of the signal.

It is the hope of every professional monitor that they never hear an ELT. The signal can only foretell a tragedy. However, if you should monitor one, do not fail to report it. Emergency Locator Transmitters -- and responsible, professional monitors like yourself -- save lives.